

The Durban beach monitoring program: simple surveys speak volumes

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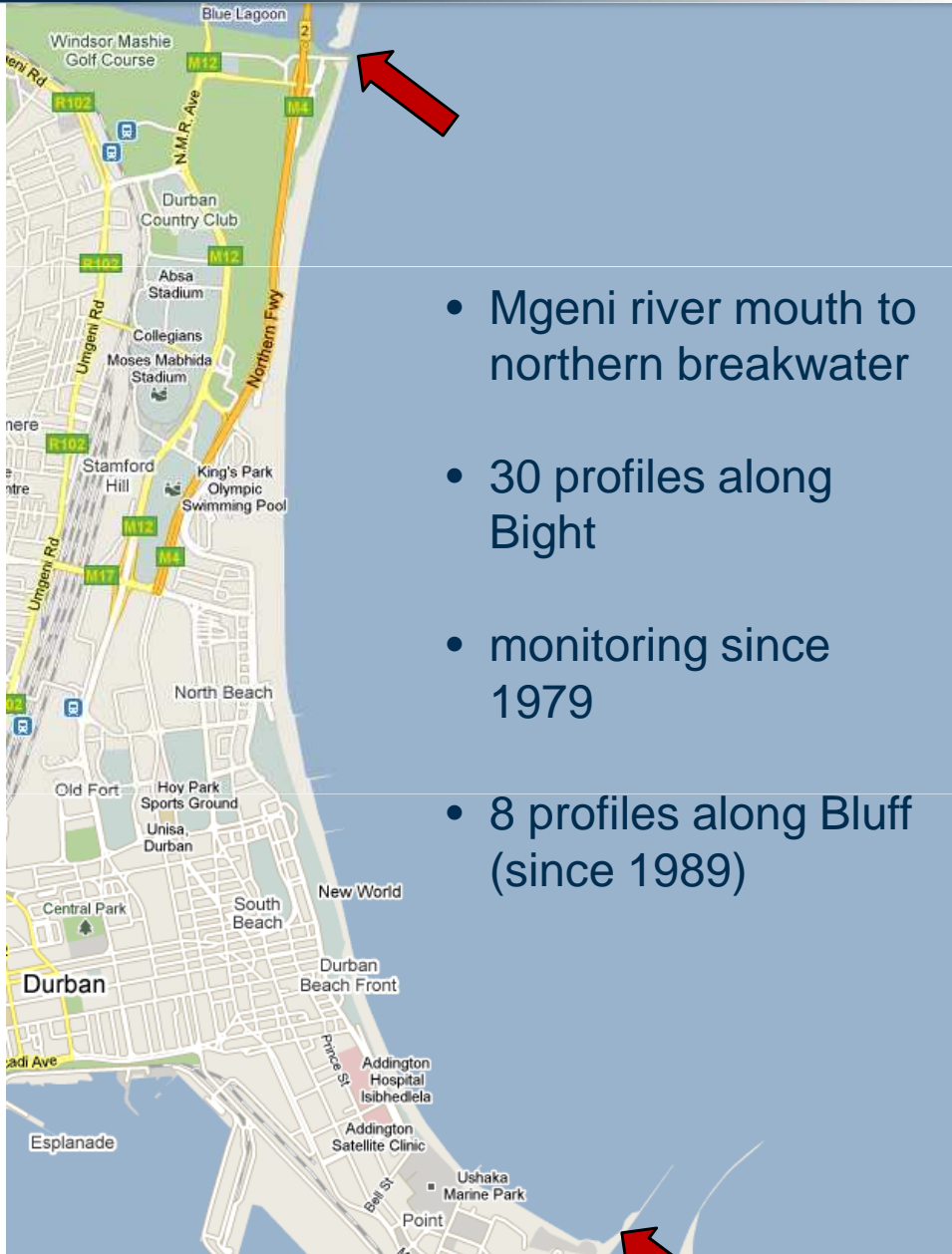
Outline

- Background / History
- Monitoring area
- Examples of survey data & trends
- Conclusions

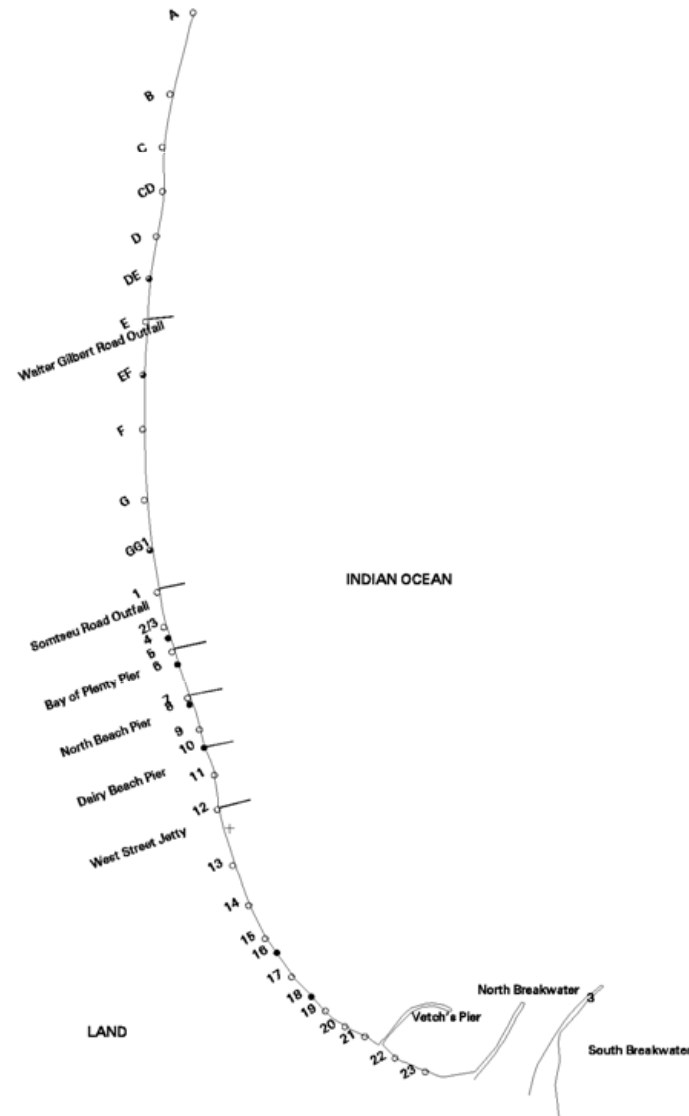
Introduction

- Durban Port entrance channel deepening & widening (1903 – ...) → erosion of N.beaches
- sand pumping (1935 – ...), low-level groynes / piers (mid 1980s)
- eThekweni Municipality ★ monitoring scheme for more than 30 yrs → responsible, sound coastal management
- identification of long-term trends, quantify pumping volumes
- observation data NB local, regional, national → implications of Integrated Coastal Management Act (ICMA)?
- not shown: sediment data, sediment loss volumes, pumping / replenishment volumes, pier scour profiles, groyne rock levels

Beach monitoring: Durban Bight



- Mgeni river mouth to northern breakwater
- 30 profiles along Bight
- monitoring since 1979
- 8 profiles along Bluff (since 1989)



Beach monitoring: Northern & Southern areas

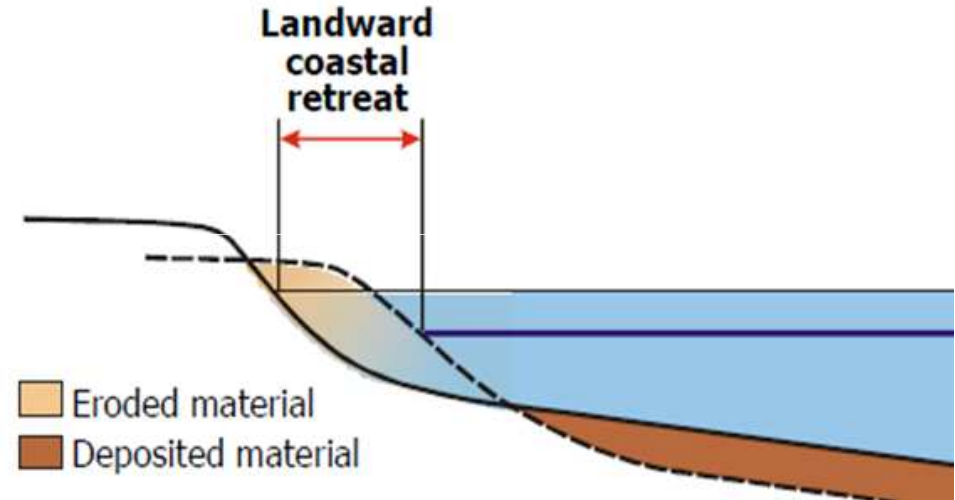
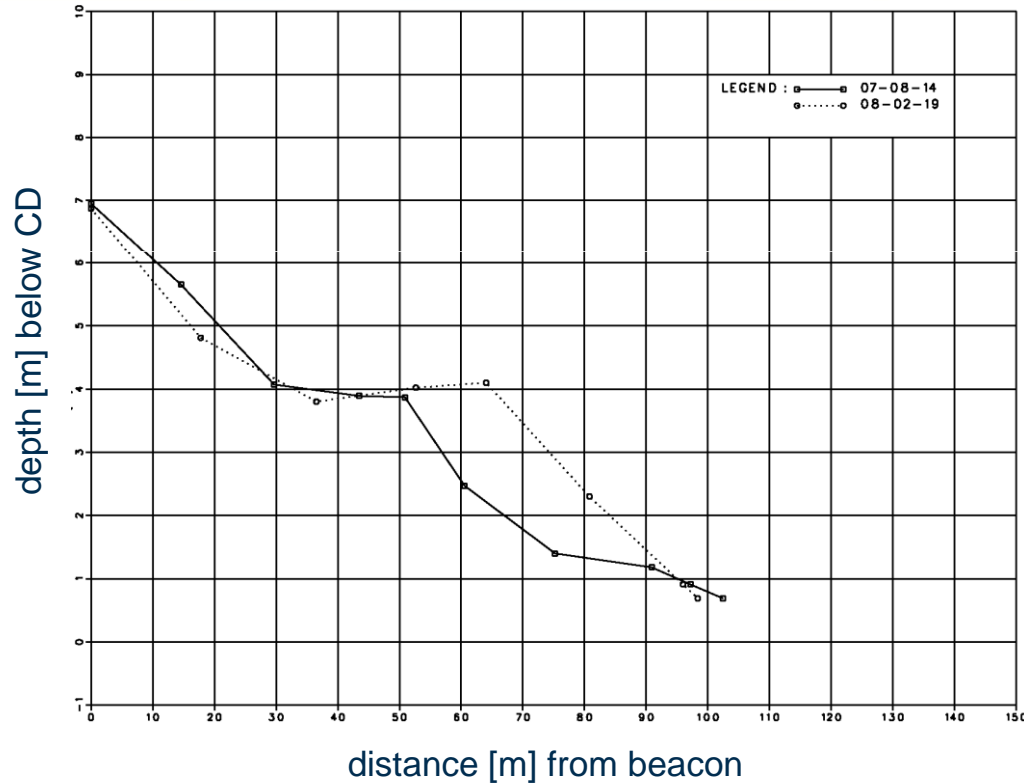


- extended 2005: 29 km North to Tongati river mouth
- 24 stations



- extended 2005: 58 km South to Mahlongwa river mouth
- 34 stations

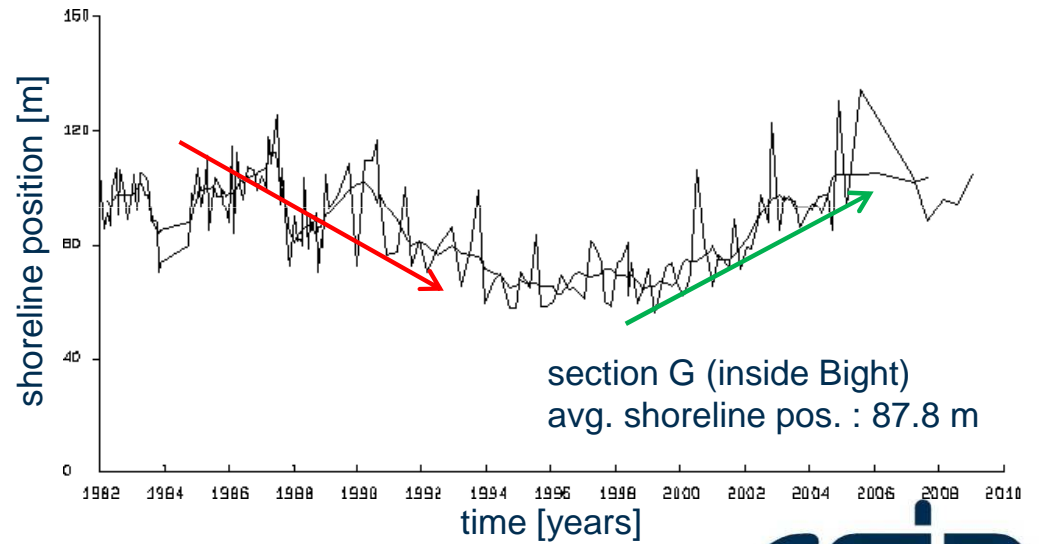
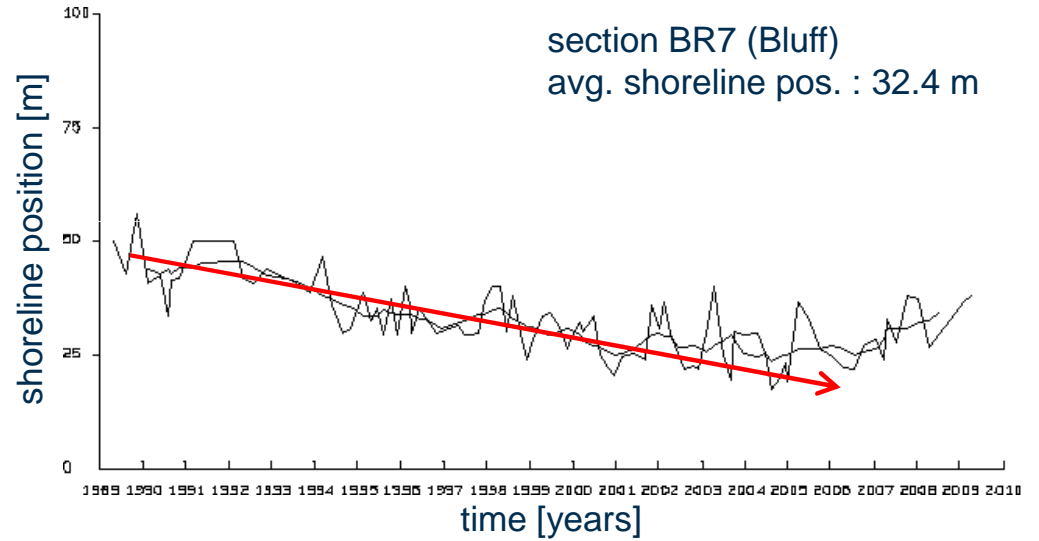
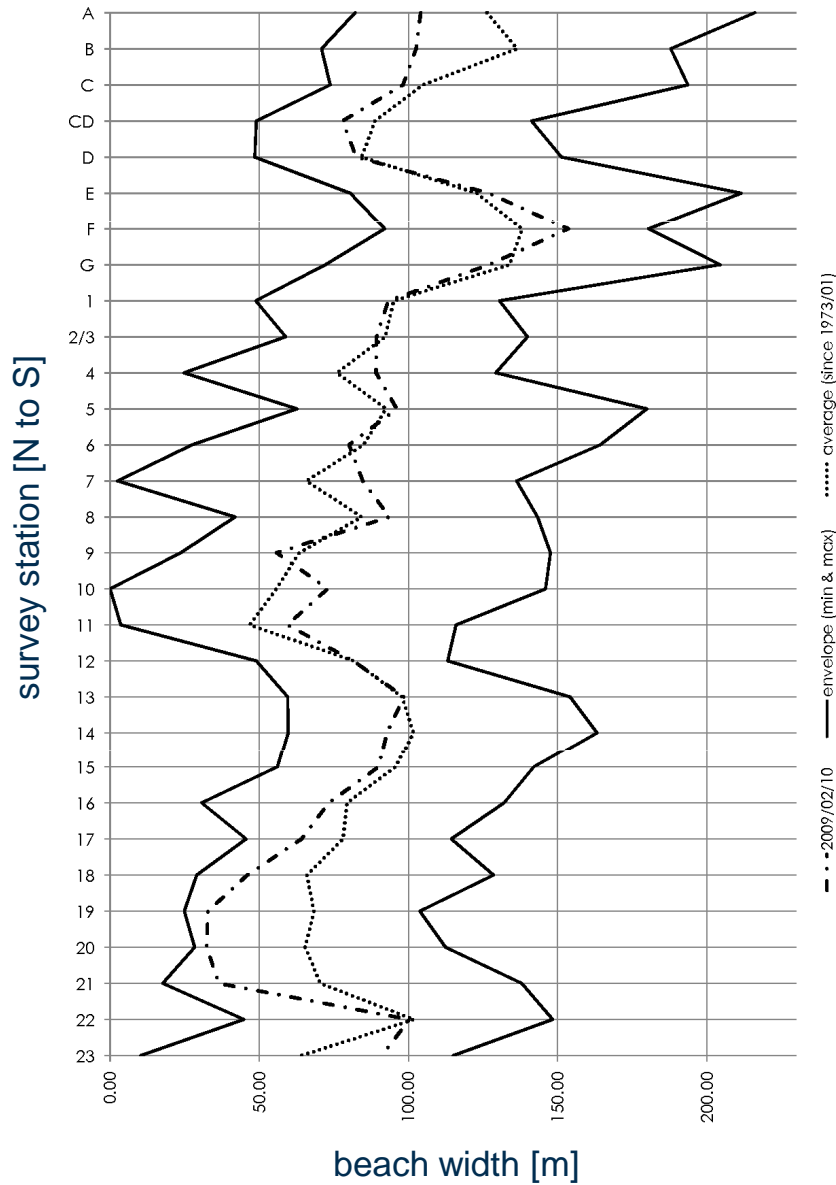
Beach survey data



beach profile showing erosion of the upper beach (berm) and near-shore deposition cf. classical understanding / scheme

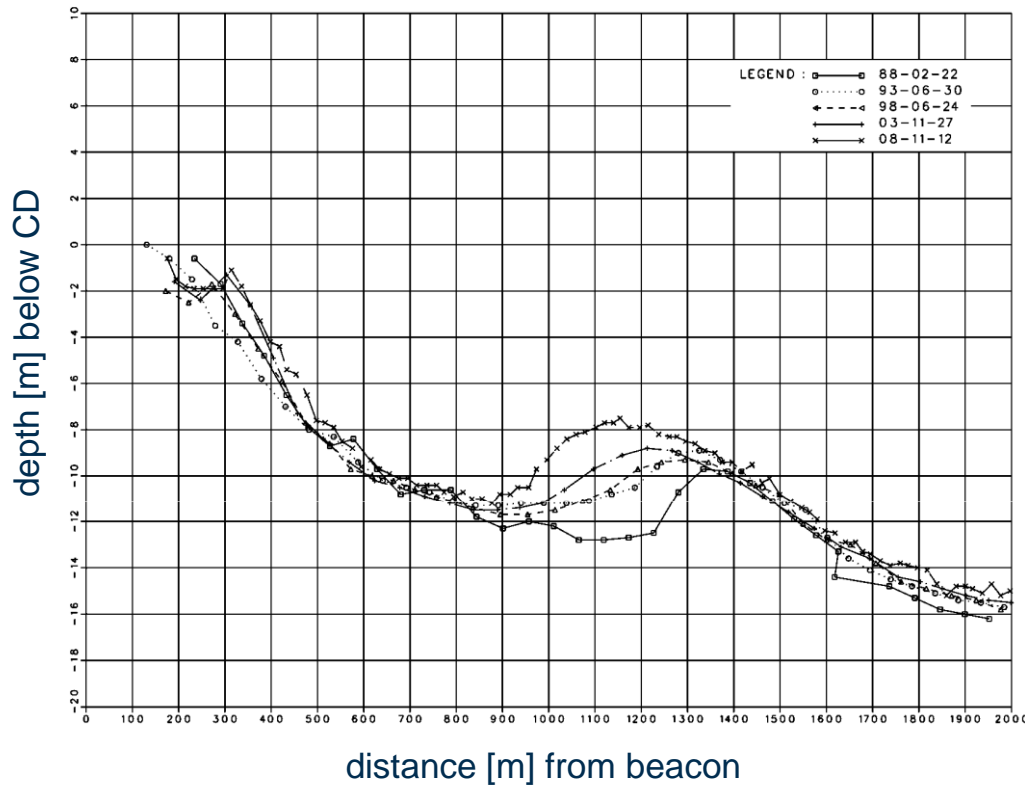
- id. areas vulnerable to erosion
- effect of replenishment rates / locations visible

Beach survey data



Bathymetric survey data

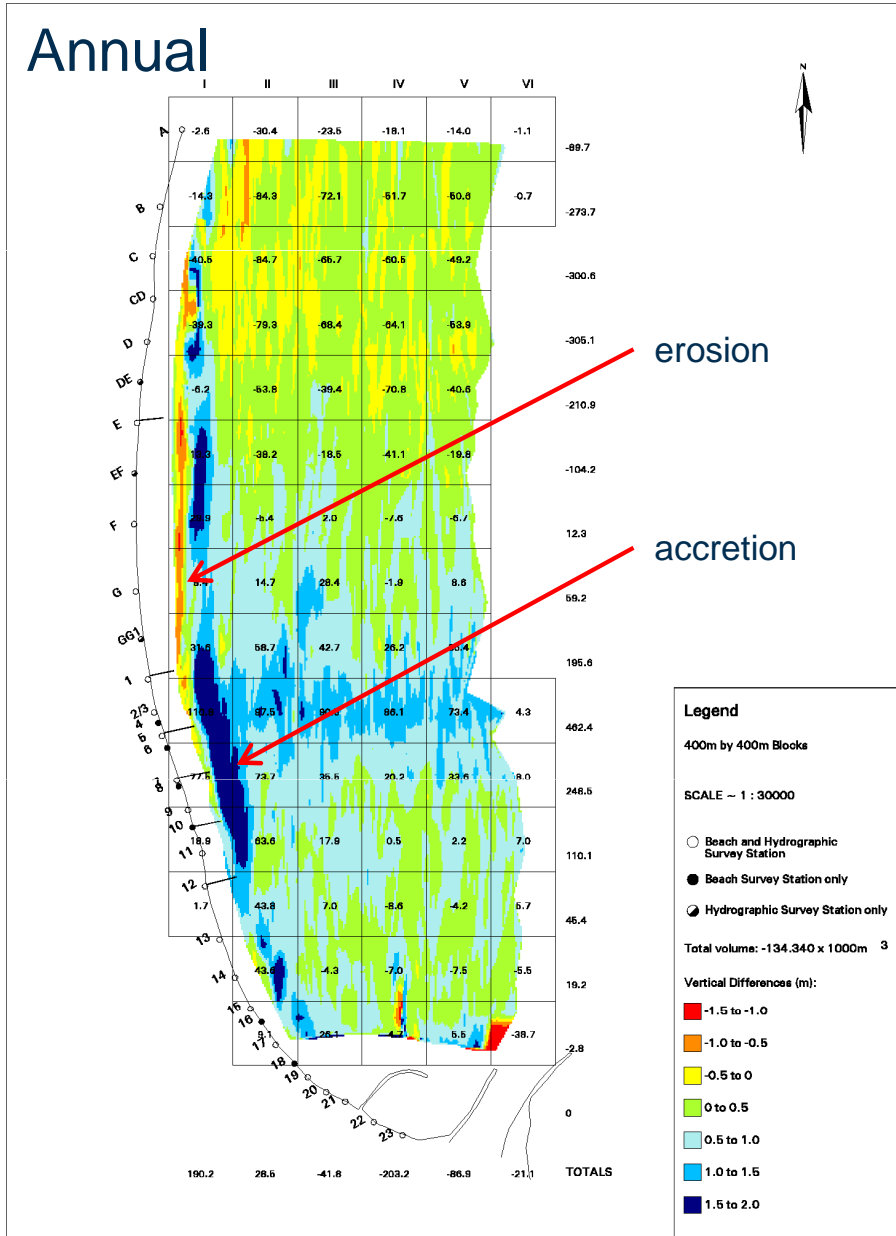
bathymetric profile of section G inside Bight



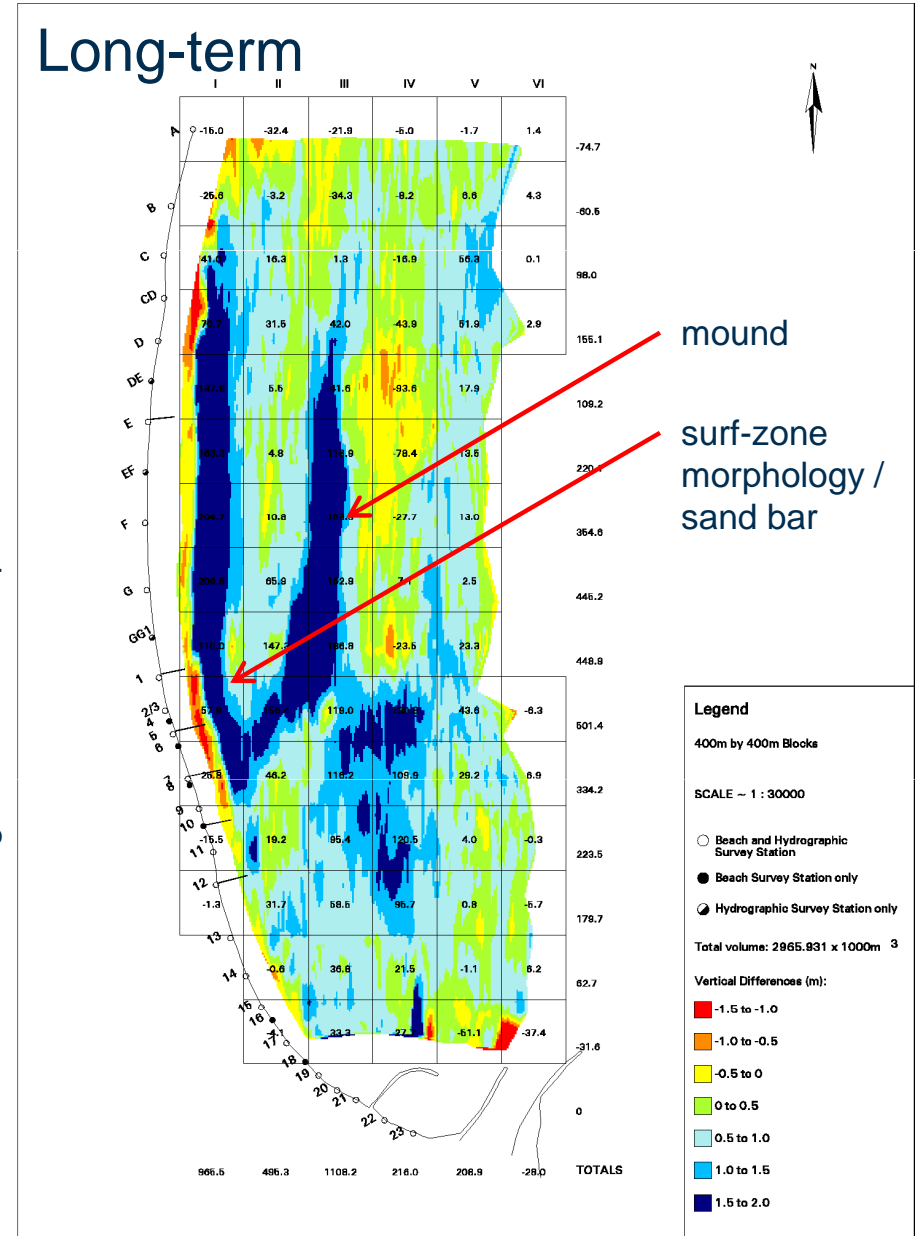
- bathymetric profiles matched to beach profiles → continuous cross-section obtained
- mound crest 1100 – 1300 m offshore from beacons
- stable in long term; showing shoreward growth

Bathymetric changes

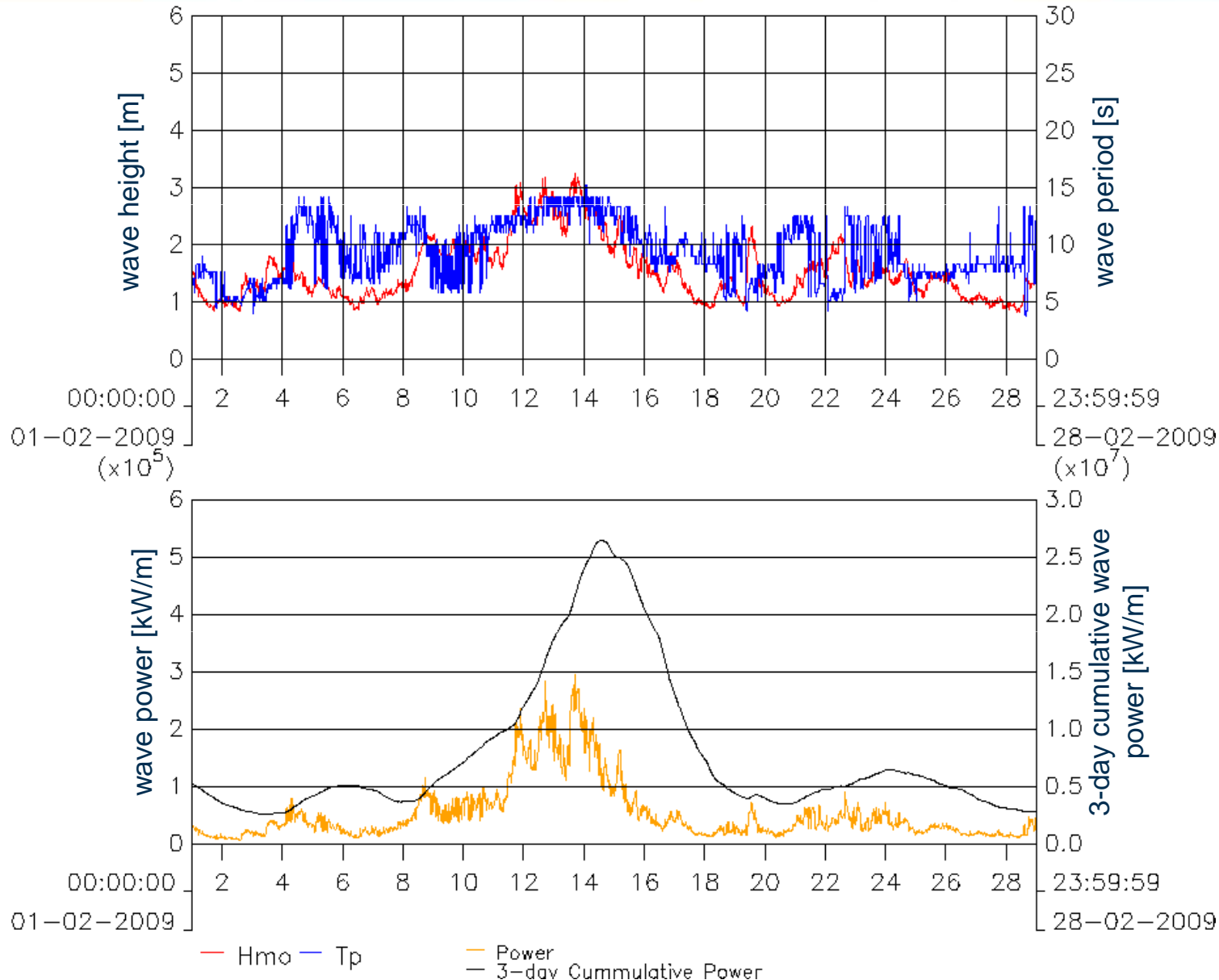
Durban Bight difference map: 2007.09 – 2008.11



Durban Bight difference map: 1994.08 – 2008.11



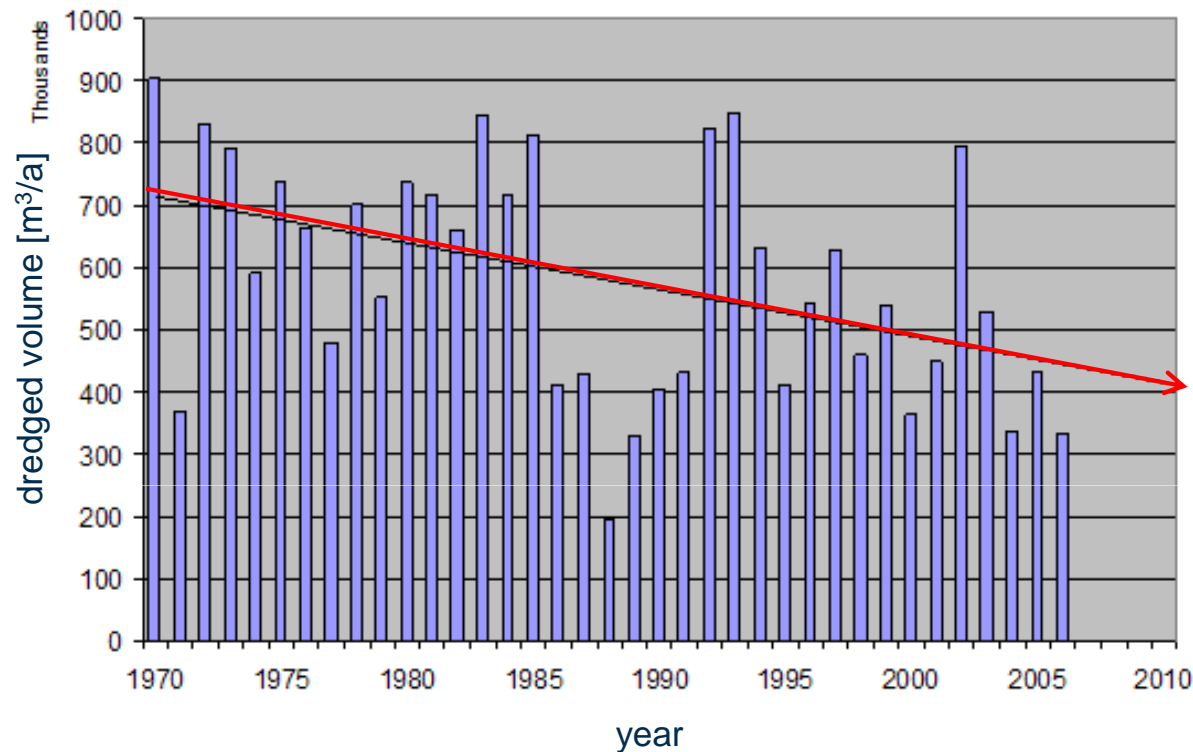
Wave data



- WaveRider buoy
 ± 1.3 km
offshore
 - id. major erosion
events \rightarrow
- + power = erosion;
cumulative effect

Sand mining / dams effects?

annual sand volumes dredged from Durban sand trap since 1970



- sand mining / dams
- reduced sand supply = reduced coastal sand reservoir → greater storm erosion & long-term shoreline recession
- other threats, e.g. combined impacts of sea level rise & increased sea storminess → severe coastal erosion likely

Conclusion

- relatively inexpensive, simple techniques
- importance / use of abiotic, physical parameters
- response of coast to anthropogenic influences / interventions, extreme events
- identification of long-term trends
- observation data NB local, regional, national → implications of Integrated Coastal Management Act (ICMA)?
- responsible, wise coastal management

Thank you